

REMARKS

The foregoing amendments are responsive to the Office Action mailed on June 9, 2005. Claims 1-9 are pending in this application. Claims 1, 4 and 7 have been amended to provide fuel cells that include solid electrolytes. Support for such amendments can be found, inter alia, on page 3-5, paragraphs [0015]-[0017] of Applicants' specification. By the foregoing amendments, it is submitted that claims 1-9 are in condition for allowance and requests such an allowance. Thus, Claims 1-9 are presented for examination by the examiner.

Also, accompanying this communication is a Petition to Extend the prosecution to December 9, 2005, along with authorization of the appropriate fee.

Discussion of the Office Action

In the Office Action of June 9, 2005, the Examiner rejected claims 1-9 under 35 U.S.C. §103.

Discussion of Rejection of Claims 1- under 35 U.S.C. §103

Claims 1-9 stand rejected under 35 U.S.C. 103 as being unpatentable over US Patent 5,114,803 issued to Ishihara (hereinafter "Ishihara") in view of US Patent 3,375,138 issued to Mather et al. (hereafter "Mather").

Applicants' presently claimed invention includes a fuel cell having a solid electrolyte and electrodes containing pores that are tapered. According to the examiner, the Ishihara reference discloses Applicants' claimed fuel cell except for a disclosure of tapered pores. The examiner has cited the Mather reference as disclosing tapered pores in a fuel cell. Accordingly, the examiner has combined Mather with Ishihara to show that, according to the examiner, "...it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the electrode of Ishihara with the tapered pores of Mather to produce a more efficient electrode that reduces the flooding of the fuel cell." The examiner supports his

argument as follows: "Mather teaches tapering the pore size in the electrode structure (4:29-35). The taper of the pores allows greater interaction at the surface of the electrode, while maintaining the pore diameters small at the center of the electrode prevents the electrolyte from flooding."

However, Applicants' fuel cell having a solid electrolyte does not have an electrolyte flooding problem that would impair its efficiency. The Ishihara reference discloses detailed methods of firing electrode compositions to produce different groups of pores sizes by utilizing different particle diameters and different firing temperatures (such as approximately 1400 C. in sintering atmospheres) for each pore size achieved, and additional firing of solid electrolyte compositions (such as YSZ) onto the electrodes (See Ishihara, for instance, in col. 4, line 56-col. 6, line 16, as well as throughout the reference). Nowhere in Ishihara is it disclosed or suggested how to generate a tapered pore in these groups of pore sizes. Nowhere in Ishihara is it disclosed or suggested that the Ishihara electrolytes have a flooding problem.


In contrast, Mather discloses a fuel cell having a gel electrolyte which has a flooding problem (See Mather at col. 3, lines 25-38, and at col. 4, lines 32-36, as cited by the examiner). A feature of Mather is that the electrolyte has to be of a consistency that penetrates a portion of the porous electrode. Mather does not disclose or suggest a fuel cell having a solid electrolyte. Nowhere in Mather is it disclosed or suggested as to how or why to taper pores in the presence of a solid electrolyte. Furthermore, Mather teaches that carbon electrodes can be burned out at 900 C. in an atmosphere of carbon dioxide and carbon monoxide to taper the pores (See Mather at col. 4, 37-46). It is not readily apparent how such a method would enable one of ordinary skill in the art to generate tapered pores in combination with Ishihara's methods of firing compositions.

The combination of the Ishihara and Mather references is motivated by the hindsight reasoning of the examiner. The voids of Ishihara are attempted to be filled by utilizing Applicants' specification and claims as a guide-not the references

themselves – as is the applicable standard. No prima facie case of obviousness can be established by such an inappropriate combination. There is no teaching in the Mather reference disclosing tapering pores in a gel electrolyte fuel cell (i.e., not a solid electrolyte fuel cell) that would motivate one of ordinary skill in the art to taper the pores in Ishihara's fuel cell that includes a solid electrolyte, or how to do it. The skilled artisan would not look to Mather to solve a non-existent flooding problem in Ishihara. Accordingly, the rejection for obviousness in view of the cited references should be withdrawn.

In the event that the Examiner finds any remaining impediment to the prompt allowance of these claims that could be clarified with a telephone conference, he is respectfully requested to initiate the same with the undersigned at (925) 422-7820.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Alan H. Thompson", written over a horizontal line.

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Dated: 12-08-2005